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An Empirical Investigation of First Term Attrition

The research reported in this paper represents an attempt to
identify "high risk" attrition factors in first term enlistees. In
contrast to previous studies, this resaerch looks at a comparison
between soldiers still in the Army, early dischargees, and soldiers
completing their tour (ETS). The variables being investigated include
soldier demographics, job characteristics, work environment, attrac-
tiveness of civilian opportunities, quality of location of assignment,
and soldier gender.

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INTRODUCTION

First term enlisted attrition costs the Army hundreds of millions of dollars each year. In a 1980 Report to Congress, the General Accounting Office (GAO) determined that enlisted attrition from the 1974 to 1977 Cohort Years cost the government 5.2 billion dollars. These costs include the recruiting, training, and out-processing of early discharges, replacement recruiting, training and in-processing, in addition to veteran's and medical benefits to qualified early discharges (attritees). In addition to the high monetary costs, attrition also puts stress into the Army system. Personnel turbulence may affect unit readiness and unit effectiveness. Attrition creates a "domino effect" affecting recruiting (USAREC) and training (TRADOC) - i.e., more recruits and training for these new recruits is needed.

Although attrition is costly - as evidenced by both monetary and system stress, a certain amount of attrition is to be expected and welcome. No system of recruiting is perfect, so some "weeding out" of unqualified recruits is needed. What the optimum level of attrition should be has not been determined. What has been determined, however, is that the present attrition rate and attrition costs are too high.

When reviewing the literature on attrition, (c.f., Sinaiko, 1977; Goodstadt, Yedlin, 1979; Mobley, Hand, Baker and Meglino, 1979; Martin, 1977; Wiskoff, Atwater, Houle and Sinaiko, 1980; etc.) several things became clear. Differences in rates of attrition have been found between male and female soldiers (Ross & Nogami, 1981; Fox, 1979; Martin, 1979; Addington, 1979; and Tolk, 1978), between educational groups (Fox, 1979; Guthrie, Lakota, and Matlock, 1978; Manning & Ingraham, 1981), between female traditional and non-traditional MOS (Tolk, 1978; Ross & Nogami, 1981) and between stations of assignment (Whittenburg & Dahlinger, 1978).

Beyond these categorizations little research has been done. There have not been any answers to questions such as: How does male attrition differ from female attrition? What is it about female traditional MOS which effects attrition? What are the differences between stations of assignment which affects attrition? How do the various demographic and biographic characteristics interact to affect attrition?

To systemically answer the above concerns, we at ARI have undertaken
a four year programmatic research effort. We are now in the beginning
of our second year. In this paper, I would like to present two studies--
one, an analysis of the DMDC 1976 Cohort Data Base and, two, preliminary
results from an on-going field research project.

1976 Enlisted Cohort Data Base

The objective of this research effort was to determine whether
attrition rates differed by (a) soldier gender, (b) soldier characteristics,
(c) type of discharge action, and (d) the traditionality of the Military
Occupational Speciality (MOS). To achieve this objective, we analyzed
the Defense Manpower Data Center (DMDC) fiscal year 1976 Enlisted Cohort
Data Base.

To have comparable numbers for analysis, the ARI data base included
all FY 1976 nonprior service 3-4 year female enlistees, and 10% of all
FY 1976 nonprior service, 3-4 year male enlistees. Male enlistees were
selected on the basis of the last digit of their social security number.

Because soldier gender, soldier characteristics and MOS were of
importance for this project, only those MOS with at least 10 females and
10 male soldiers was included. Consequently, all combat MOS were excluded
from the data base. In addition, all non-white, non-black, "other"
personnel were excluded (this included only 680 persons - too small for
analysis by ethnic group and MOS). For more information on the data
base see Ross & Nogami (1981).

Analyses: Two types of statistical tests were used to analyze the data:
(1) multi-dimensional chi-square and (2) analysis of variance. The
multi-dimensional chi-square analyses compared all individuals within a
traditionality category with all other individuals in other traditionality
categories. The analyses of variance compared MOS attrition rates
within a category to other MOS attrition rates in other categories. As
such, the analysis of variance techniques emphasized the dispersion of
different MOS attrition rates.

Results and Conclusions: 1. The variables of race, education, and AFQT
were included in the overall multi-dimensional chi-square analysis used to
evaluate gender and traditionality. Education, race, and AFQT related
strongly to attrition; higher rates of attrition occur for (1) the non-high
school diploma graduates (including GEDs) than high school diploma graduates,
(2) whites than blacks, and (3) Category III and IV than Category I and
II. It is important to note that there were several two-way interactions
in these data (shown in Table 1). These interactions indicate that differ-
ences in attrition rates related to one variable (such as education) are
not constant when a second variable (such as gender) is considered. In
the data the overall difference between male and female attrition rates

TABLE 1

ATTRITION RATES FOR
EDUCATION x GENDER, RACE x GENDER
AND RACE x EDUCATION

EDUCATION x GENDER

EDUCATION		MALE	FEMALE	
	HSDG	.23 (4,428)	.39 (11,177)	.35 (15,605
	NHSDG	.50 (3,453)	.56 (1,385)	.52 (4,838
		.35 (7,881)	.41 (12,562)	

RACE x GENDER

RACE		MALE	FEMALE	
	BLACK	.33 (2,237)	.28 (2,430)	.31 (4,667
	WHITE	.35 (5,644)	.44 (10,132)	.41 (15,776
		.35 (7,881)	.41 (12,567)	

RACE x EDUCATION

RACE		HSDG	NHSDG	
	BLACK	.26 (3,616)	.48 (1,051)	.31 (4,667)
	WHITE	.37 (11,989)	.53 (3,787)	.41 (15,776
		.35 (15,605)	.52 (4,838)	

AFQT x GENDER

AFQT		MALE	MALE	
	(Cat. I, II)	.27 (2,285)	.40 (9,051)	.37 (11,336
	(Cat. III, IV)	.38 (5,596)	.44 (3,511)	.40 (9,107)
		.35 (7,881)	.41 (12,562)	

for Education x Gender was .06 (.35 - .41). But this difference was not constant for males and females at the two education levels. Graduate men and women differed by .16 (.23 - .39) while non-graduates differed by only .06 (.50 - .56) (See Table 1).

2. Males and females attrited for different reasons. More females than males attrited due to family related causes and pregnancy (9% and 25% differences, respectively). Male attrition was higher for TDP (8%), EDP (5%), medical (6%) and adverse causes (15%). There was no difference between male and female attrition due to "other non-adverse causes" (See Table 2).

TABLE 2

ATTRITION RATES FOR SEPARATION CATEGORIES

	TDP	EDP	MEDICAL	PREGNANCY	ADVERSE	OTHER NON-ADVERSE	FAMILY RELATED
Male	33%	25%	13%	--	24%	2%	3%
Female	25%	20%	7%	25%	9%	2%	12%

3. The MOS job traditionality data were analyzed with multi-dimensional chi-square and an analysis of variance techniques. The multi-dimensional chi-square analysis showed that MOS job traditionality has a moderate effect on female attrition rates (See Table 3). Overall female attrition was lowest in the traditional female MOS category, intermediate in the less traditional, and highest in the non-traditional female MOS category. For males, traditionality of MOS categories appeared to have no effect. In contrast to the chi-square analysis, the analysis of variance for job traditionality and gender was non-significant even though the percent/ proportion differences between males and females was as large as or larger than the differences in the chi-square analysis.

In addition, the differences between male and female attrition rates is not as simple as Addington (1979) would lead us to believe. Addington suggested that female attrit at a constantly higher rate than males over MOS. OUr data indicates that in may MOS, females do have ahigher attrition rate (e.g., 03c with 21.8% more female attrition; 71D with 28.4% more female attrition, etc.). However, there are MOS where males have a higher attrition rate than females (e.g. 91R, with 21.9% more male attrition; 91T, with 9.1% more male attrition) and MOS with similar attrition rates for males and females (e.g., 71G and 91D). In an effort to understand the dynamics which influence different MOS attrition rates, we have embarked on a field research project. (See Table 4)

TABLE 3

Multi-dimensional Chi-Square Analysis

Gender X Traditionality
$p < .0000$

	Male	Female	Difference
Traditional	.34[1]	.37	+.03
Less Traditional	.35	.43	+.08
Non Traditional	.35	.46	+.11

Analysis of Variance

Gender X Traditionality
$p = .18$

Not significant	Male	Female	Difference
Traditional	.28	.36	+.08
Less Traditional	.35	.41	+.06
Non Traditional	.31	.45	+.14

[1] Proportion of attrition to non-attrition. Can be directly translated to percent attrition.

TABLE 4

COMPARISON OF MALE AND FEMALE ATTRITION FOR SELECTED MOS

TRADITIONAL MOS

PMOS	$(\Sigma\ n)$MALE	$(\Sigma\ n)$FEMALE	%MALE ATTRITION	%FEMALE ATTRITION	DIFFERENCE
03C	11	15	18.2	40.0	21.8
05B	129	67	40.3	47.8	7.5
26Q	21	57	4.8	17.5	12.7
31N	14	69	50.0	55.1	5.1
31V	104	70	42.3	37.1	- 5.2
32D	18	29	27.8	37.9	10.1
71D	19	95	10.5	38.9	28.4
71G	18	29	27.8	27.6	- 0.2
91D	27	56	29.6	26.8	- 2.8
91P	10	49	10.0	36.7	26.7
91R	14	96	50.0	28.1	-21.9
91T	11	11	27.3	18.2	- 9.1

Field Investigation of First Term Attrition

The objective of this research is to determine how attrition varies as a function of the characteristics of (a) the enlistee (i.e., demographics, reasons for elisting, morale); (b) the MOS or job (i.e., traditionality of MOS, job environment, and competing civilian opportunities); and (c) location of assignment (i.e., Continental United States (CONUS)-Europe (USAREUR), well-liked vs. disliked post, availability of recreational and service facilities).

The resulting research design incorporates 2 geographic locations (CONUS and USAREUR), 2 levels of quality of installation (desirable vs. undesirable), 4 levels of MOS traditionality (female traditional, less traditional, non-traditional and combat) and gender (male and female). (See Figure 1).

QUALITY

	Desirable	Undesirable
CONUS	**	**
USAREUR	**	**

**contained within cell is the design below

GENDER

		Male	Female
TRAD		CMF 31 71 (n=50)	CMF 31 71 (n=50)
LESS TRAD		CMF 76 95 (n=50)	CMF 76 95 (n=50)
NON-TRAD		CMF 63 64 (n=50)	CMF 63 64 (n=50)
COMBAT		CMF 11 13 (n=100)	

TRADITIONALITY OF MOS

FIGURE 1. Research Design

Fifty first term enlisted males and fifty first term enlisted females in the traditional, less traditional an non-traditional MOS and one hundred first term enlisted males in the combat MOS were surveyed. In addition, one hundred first term enlisted early dischargees and one hundred soldiers completing their term of enlistment were surveyed to provide comparison groups.

To provide a leadership perspective to first term attrition, 25 non-commissioned officers (E6 and above) and 25 Company commanders were administered a leadership survey.

Results: Data collection in CONUS has been completed; but we are still waiting for 20 questionaires which have been in the mail for over 3 weeks. Data collection in USAREUR is nearing completion. Consequently, the results presented today will only cover the CONUS data, and these are preliminary findings.

Table 5 presents the total numbers of analyzable enlisted question-naires in CONUS. The numbers of usable questionnaires from the early dischargees and soldiers completing their enlistment was too low to allow a full factorial design. Until all data is in, analysis of these may be misleading. Consequently, the data presented will only be on first term enlisted soldiers still in the Army.

The preliminary results presented below were selected from over 130 questions. They were selected on two criteria: (1) there must be two or more results in the same direction and (2) acceptable significant levels must have been demonstrated. The results are presented in five sections: (1) reasons for enlisting, (2) work environment, (3) off-duty environment, (4) MOS (Job) characteristics, (5) availability of facilities.

LOCATION

	UNDESIRABLE		DESIRABLE	
	M	F	M	F
TRAD	45	34	41	48
LESS TRAD	44	47	35	34
NON-TRAD	83	43	63	25
COMBAT	113		99	

TABLE 5

DEMOGRAPHICS: TRADITIONALITY OF CMF BY GENDER BY DESIRABILITY OF LOCATION

1. Reasons for Enlisting: Career opportunities are more important to
females than to males as a reason for enlisting.

    1.   Career opportunities in the military look better than those in
civilian life. (19) (p=0.028)

                         Males = 2.38
                         Females = 2.24

    2.   I could make more money outside the Army. (70) (p=0.00)
                         Males = 4.03
                         Females = 3.62

    3.   A person can get more of an even break as a civilian than as a
soldier. (51) (p=0.083)

                         Males = 3.52
                         Females = 3.36

2. Work Environment: A more desirable location is related to more
satisfactory work climate.

    1.   All in all, I am satisfied with the soldiers in my work group.
(58) (p=0.009)

                         Desirable = 3.34
                         Undesirable = 3.07

    2.   All in all, I am satisfied with the Army. (59) (p=0.02)
                         Desirable = 2.84
                         Undesirable = 2.64

    3.   All in all, I am satisfied with my unit. (60) (p=0.031)
                         Desirable = 2.55
                         Undesirable = 2.34

3. Off-Duty Environment: A.   The installation we labeled as desirable
is confirmed by respondents.
    1.   I want a reassignment to another post. (41) (p=0.003)
                         Desirable = 3.41
                         Undesirable = 3.73

    2.   All in all, this is a good post for me to live on. (61) (p=0.000)
                         Desirable = 2.69
                         Undesirable = 2.21

  B.   Females need more time off to take care of personal and family needs.
    1.   From the time you arrived at this installation, how many days have
you been sick and could not work? (6A) (p=0.000)
                         Males = 2.12
                         Females = 2.86

2. I have enough time off to take care of my personal and family
needs. (38) (p=0.035)

> Males = 2.53
> Females = 2.32

4. MOS (Job) Characteristics: A. Females have more of a mismatch
between their PMOS and duty MOS than males.

1. MOS: I am working in my Pr..ary MOS. (119) (p=0.000)

> Males = 1.34
> Females = 1.61

2. I am working in the job areas for which I have been trained. (121) (p=0.001)

> Males = 1.26
> Females = 1.39

3. What is your PMOS? What is your DMOS? (8,10)

> Average Percent Mismatch
> Males = 13.28%
> Females = 27.65%
> (see Chart)

B. Males spend more duty time in traditional male jobs (outdoors), females
spend more duty time in traditional female (desk) jobs.

1. Outdoors   (76) (p=0.000)

> Males = 3.19
> Females = 2.54

2. Doing heavy labor   (77) (p=0.000)

> Males = 2.45
> Females = 1.86

3. Dangerous work   (78) (p=0.000)

> Males = 2.13
> Females = 1.63

4. Dirty-Muddy-Oily work   (79) (p=0.000)

> Males = 2.90
> Females = 2.20

5. Ash and Trash   (80) (p=0.030)

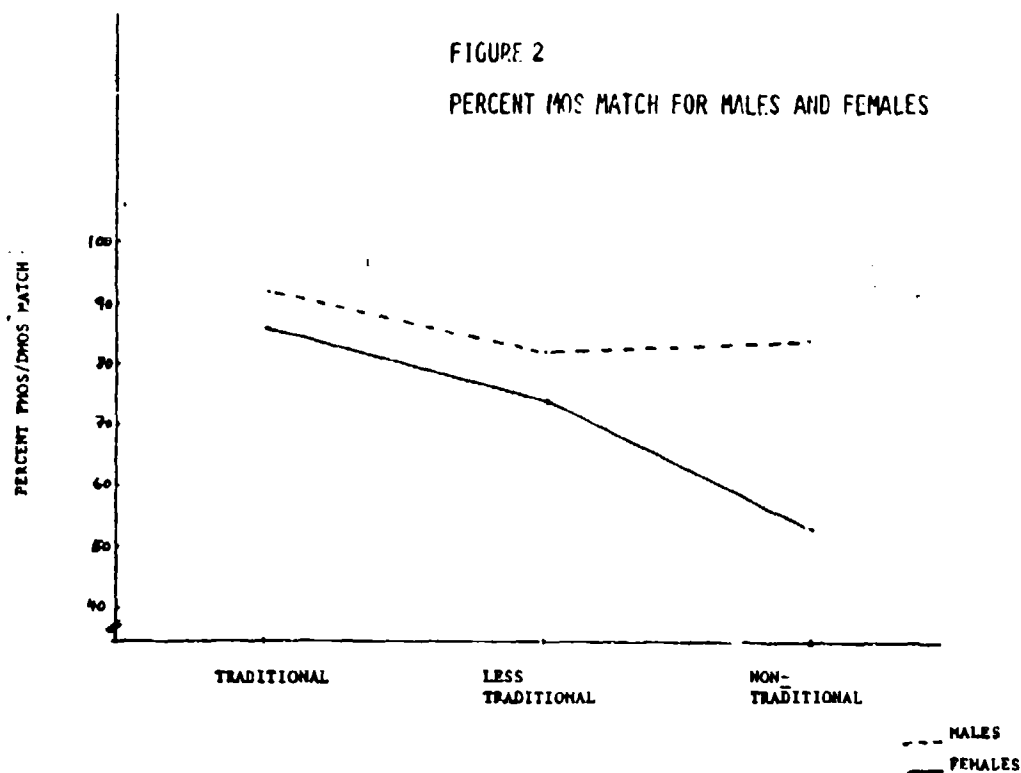> Males = 2.27
> Females = 1.96

6. Indoors   (81) (p=0.000)

> Males = 2.63
> Females = 3.51

7. Doing paper work (82) (p=0.000)

                             Males = 2.48
                           Females = 3.45

8. Doing important work (83) (p=0.001)

                             Males = 3.15
                           Females = 3.61

FIGURE 2

PERCENT MOS MATCH FOR MALES AND FEMALES

5. Availability of Facilities: At both desirable and undesirable loc
soldiers are satisified with about the same total number cf on-post pl
off-post facilities.

Satisfaction with Facilities and Services
Location

	Undesirable	Desirable
On-Post	7.57	6.025
Off-Post	3.93	5.06

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